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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/677,007	09/30/2003	Tingkai Li	SLA0793	7277

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EXAMINER
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TALBOT, BRIAN K

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 05/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/677,007

Applicant(s)

LI ET AL.

Examiner

Brian K. Talbot

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on RCE filed 2/27/06.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9-20 is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/27/06 has been entered. Claims 1-20 remain in the application.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. The Examiner noted Applicant's willingness to submit a Terminal Disclaimer upon allowance of the claims, however, no Terminal Disclaimer has been filed. The Examiner requests the filing of the Terminal Disclaimer in response to this Action, as it will expedite the prosecution if the application is allowed.

***Claim Rejections - 35 USC § 112***

4. Claims 1,9 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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The claims are confusing. The preamble recites “an indium-containing substrate” and the body of the claim recites a “silicon substrate”. Clarification is requested. In addition to the confusion, it is noted that Applicant’s arguments stating the invention is “a method of forming an indium-containing thin film on a silicon substrate” (pg. 1 of remarks filed 2/27/06). This is different from what is claimed as the claims recite both an indium-containing substrate and a silicon substrate.

### *Double Patenting*

5. Claims 1-20 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-18 of copending Application No. 10/676,983 and claims 1-19 of copending Application No. 10/780,919. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims recite forming an indium oxide film on a silicon substrate, etching or patterning the indium oxide film, forming a ferroelectric film of PGO thereon, and completing the device.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

*Claim Rejections - 35 USC § 103*

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (6,825,519) in combination with Asano et al. (6,407,422).

Li et al. (6,825,519) teaches selectively depositing PGO thin film to form a ferroelectric device. A silicon oxide layer is formed on a silicon substrate, a bottom electrode is formed and patterned thereon, a PGO layer is applied, annealed and a top electrode is formed to complete the device (abstract, col. 1, lines 40-60).

Li et al. (6,825,519) fails to teach a patterned indium oxide layer as the bottom electrode.

Asano et al. (6,407,422) teaches a memory device whereby a silicon substrate (11) has a layer of metal (51) including indium/indium oxide deposited thereon. An oxide layer (52) is applied to the layer (51). Patterning and selective etching of the layer indium/indium oxide layer (51) is performed. Deposition of a ferroelectric material and top electrode are formed to

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complete the device. The ferroelectric layer is applied by MOCVD (col. 1, lines 15-25 and col. 5, lines 45-60).

Therefore it would have been obvious for one skilled in the art at the time the invention was made to have substituted the electrode material of Li et al. (6,825,519) process by incorporating indium/indium oxide for the electrode material as evidenced Asano et al. (6,407,422) with the expectation of achieving similar success.

Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (6,825,519) in combination with Asano et al. (6,407,422) further in combination with Li et al. (6,664,116).

Features described above are incorporated here.

Li et al. (6,825,519) in combination with Asano et al. (6,407,422) fail to teach the claimed processing parameters for forming the PGO film.

Li et al. (6,664,116) teaches the claimed processing parameters for forming the PGO film (col. 2, line 10 – col. 3, line 50).

Therefore it would have been obvious for one skilled in the art at the time the invention was made to have modified Li et al. (6,825,519) in combination with Asano et al. (6,407,422) by forming the PGO film as detailed by Li et al. (6,664,116) with the expectation of achieving similar results.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (6,825,519) in combination with Asano et al. (6,407,422).

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Features described above are incorporated here.

Li et al. (6,825,519) in combination with Asano et al. (6,407,422) fail to teach the claimed processing parameters for forming the In<sub>2</sub>O<sub>3</sub> film.

While the Examiner acknowledges this fact, it is the Examiner's position that sputtering indium oxide films are conventional in the art and the processing parameters utilized to produce the indium oxide film would be a matter of design choice of one practicing in the art dependent upon the desired final product. Absence a showing of unexpected results garnered from the specific claimed parameters, it is the Examiner's position that one skilled in the art would have had a reasonable expectation of success optimizing these well known processing parameters.

***Allowable Subject Matter***

8. Claims 9-20 are allowed.

***Reasons for Allowance***

9. The following is an examiner's statement of reasons for allowance:

The prior art of record fails to teach or fairly suggest forming an indium-containing layer on a silicon substrate, patterning the indium-containing layer, annealing, forming a ferroelectric layer by MOCVD on the patterned indium-containing layer and annealing.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue

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fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

*Response to Arguments*

10. Applicant argued that the claims are limited to the structure silicon substrate/indium containing film/ferroelectric film with no additional layers added.

The Examiner agrees with respect to claims 9-20, however, the claims 1-8 are not limited as argued. The claims are not limited with regards to the ferroelectric layer being deposited on the indium containing film. The claim recites “selectively depositing the ferroelectric film”, but does not limited it to being deposited on the indium-containing film as argued. Hence, a “barrier layer” as taught in Asano et al. (6,407,422) can be applied between the indium-containing layer and the ferroelectric layer.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian K. Talbot whose telephone number is (571) 272-1428. The examiner can normally be reached on Monday-Friday 6AM-3PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Timothy H. Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Handwritten signature of Brian K Talbot and the date 5/1/06.

Brian K Talbot  
Primary Examiner  
Art Unit 1762

BKT